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EXAMINER	
HERNANDEZ, NELSON D	

ART UNIT	PAPER NUMBER
2622	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/697,634	TAKEDA, NOBUHIRO	
	Examiner	Art Unit	
	Nelson D. Hernández	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The Examiner acknowledges the amended claims filed on August 20, 2007. **Claims 1, 6, 7 and 9** are amended.

Specification

2. The Examiner acknowledges the amended title filed on August 20, 2007. The new title is accepted.

Response to Arguments

3. Applicant's arguments with respect to independent **claim 1** have been considered but are moot in view of the new ground(s) of rejection.

4. Applicant's arguments with respect to independent **claims 1 and 9** filed August 20, 2007 have been fully considered but they are not persuasive.

The Applicant argues the following:

a. The Office Action contends that Shimoyama's blind pixels (BC) correspond to Applicant's "first reference signal for DC recovery" and Shimoyama's process for image correction by dark current subtraction (as described above) corresponds to Applicant's "first correction device which DC-recovers the signal from the predetermined pixel region" as recited in pending claim 1. [5/18/07 Office Action, p. 4]. However, Applicant is directed to a

correction method wherein DC recovery of the image is performed by initially subtracting the "first reference signal with respect to each corresponding horizontal line" and then subtracting a "representative value based on the second reference signal" as recited in amended claim 1. Thus, in performing dark current correction, Applicant initially uses the first reference signal to clamp the image signal from each horizontal line and then clamps the signal using a representative value from the second reference signal. Shimoyama, on the other hand, fails to disclose or even recognize the benefit of doing so.

➢ In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "correction method <u>wherein DC recovery of the image is performed by initially subtracting the "first reference signal</u> with respect to each corresponding horizontal line") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

b. Furthermore, the Applicant argues that it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify either AAPA or Shimoyama to perform dark current recovery of an image signal from a photoelectric element using the disclosed two-stage subtraction process. A person of ordinary skill in the art would recognize the benefit of a single correction unit, but would fail to realize the ability to reproducibility create high-

quality DC- recovered images by utilizing both correction methods. As such, Applicant respectfully asserts that this benefit is not taught by, nor is it obvious in light of AAPA and Shimoyama.

➢ The Examiner disagrees. The Shimoyama invention is presented to teach the concept of having a first correction device which correct the signal from the predetermined pixel region for each row on the basis of the first reference signal set by said setting device (Shimoyama et al. teaches performing dark current correction to the image signal based on the signal values from the blind pixels (Col. 3, line 45 – col. 6, line34)); and a second correction device which uniformly correct the signals from the predetermined pixel region on the basis of the second reference signal set by said setting device (Shimoyama et al. teaches performing dark current correction to the image signal based on the signal values from the dummy pixels (Col. 3, line 45 – col. 6, line34; see also col. 1, line 54 – col. 2, line 18)). Although, Shimoyama does not explicitly disclose subtracting the first reference signal as argued by the Applicant, the limitations as claimed <u>do not require subtraction of the first reference signal</u>. Furthermore, by teaching correcting both the first and the second reference signal Shimoyama suggest the correction of the image signal by using said first and second reference signals.

c. Accordingly, AAPA and Shimoyama - whether alone or in combination - fail to teach, disclose, or suggest DC recovery of an image signal utilizing the combination of a "first correction unit adapted to DC recovery signals of the effective pixel area based on the first reference signal with respect to each

corresponding horizontal line" and a "second correction unit adapted to DC recovery signals of the effective pixel area while evenly subtracting a representative value based on the second reference signal from each signal of a plurality of horizontal lines of the effective pixel area" as recited in Applicant's amended claim 1.

➢ The Examiner disagrees. Shimoyama et al. also discloses that although the invention has been described for a linear sensor, the concepts taught can also be applied to an area sensor (Col. 5, lines 12-16). At the time the invention was made, one of an ordinary skill in the art, after identifying this features presented by Shimoyama et al., would find obvious would find obvious to modify the AAPA teaching to correct the effective pixel area with respect to each corresponding horizontal line and also to DC recovery signals of the effective pixel area while evenly subtracting a representative value based on the second reference signal from each signal of a plurality of horizontal lines of the effective pixel area since as disclosed by Shimoyama et al. the invention can be applied to an area sensor. This would require that instead of correcting a single pixel, would correct the pixels of a line with respect to the first and second signals related to said line.

➢ Therefore, the rejections made to claims 1 and 9 are considered proper.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-4, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Shimoyama et al., US Patent 5,355,164 and further in view of Tetsuji, JP 4-37166 A.

Regarding claim 1, AAPA discloses an image sensing apparatus (Fig. 7) using an image sensing element (1a), which has a plurality of pixels arrayed in horizontal and vertical direction, wherein: the image sensing element includes an effective pixel area (effective area comprising photodiodes 1 as shown in fig. 7) which outputs signal of an object image, a first reference pixel area which outputs a reference pixel area (signal from the optical black region 6) which outputs a second reference signal for DC signal recovery, and wherein a pixel in the reference pixel area is shielded from light and has a photo-electric conversion element and outputs a signal including dark current component generated in the photoelectric conversion element (See AAPA, signals from optical black region 6; Shimoyama et al., signals from dummy pixels DC); said image sensing apparatus comprising: a correction unit adapted to DC recovery signals of the effective pixel area while evenly subtracting a representative value based on the second reference signal from each signal of a plurality of horizontal lines of the effective pixel area (page 1, line 13 – page 5, line 17).

AAPA does not explicitly disclose a the claimed first reference signal for DC signal recovery, that a pixel in the first reference pixel area is shielded from light and does not have a photoelectric conversion element, and a correction unit adapted to DC recovery signals of the effective pixel area based on the first reference signal with respect to each corresponding horizontal line.

However, Shimoyama et al. teaches an image sensing apparatus (Fig. 4) using an image sensing element (Fig. 4: 1), comprising: a setting device which sets, in one image signal output from the image sensing element, a signal (effective image signal from region RP as shown in fig. 5) from a predetermined pixel region, a first reference signal for DC recovery (from blind pixels BC as shown in fig. 5; col. 3, line 45 – col. 4, line 11), and a second reference signal (from dummy pixels DC as shown in fig. 5; col. 3, line 45 – col. 4, line 11); a first correction device which correct the signal from the predetermined pixel region for each row on the basis of the first reference signal set by said setting device (Shimoyama et al. teaches performing dark current correction to the image signal based on the signal values from the blind pixels (Col. 3, line 45 – col. 6, line34)); and a second correction device which uniformly correct the signals from the predetermined pixel region on the basis of the second reference signal set by said setting device (Shimoyama et al. teaches performing dark current correction to the image signal based on the signal values from the dummy pixels (Col. 3, line 45 – col. 6, line34; see also col. 1, line 54 – col. 2, line 18)). Shimoyama et al. also discloses that although the invention has been described for a linear sensor, the concepts taught can also be applied to an area sensor (Col. 5, lines 12-16).

Therefore, taking the combined teaching of AAPA in view of Shimoyama et al. as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Shimoyama et al. by using a first reference signal for DC signal recovery, and a correction unit adapted to DC recovery signals of the effective pixel area based on the first reference signal with respect to each corresponding horizontal line in combination with the correction unit for correcting the image signal (claimed second image signal). The motivation to do so would have been to accurately correct dark current signals from the image signal wherein when measurement errors occur in the blind pixels output of a certain line due to noise, its influences are minimized and streaks can be prevented from occurring as suggested by Shimoyama et al. (Col. 5, lines 17-34).

The combined teaching of AAPA in view of Shimoyama et al. fails to teach that the first reference pixel area is shielded from light and does not have a photoelectric conversion element.

However, Tetsuji discloses a solid-state imaging device comprising an effective pixel area (I as shown in fig. 1), a second pixel area shielded from light (II as shown in fig. 1) and a third area comprising the vertical register 12 also shielded from light and that does not have photoelectric conversion elements (III as shown in fig. 1), wherein said second and third areas are used to improve the reliability of the black signals used as a reference to correct the image signal captured by the first pixel area (See English Abstract; see also English Translation, page 6, line 4 – page 7, line 25).

Therefore, taking the combined teaching of AAPA in view of Shimoyama et al. and further in view of Tetsuji as a whole, it would have been obvious to one of an ordinary skill in the art a the time the invention was made to modify AAPA and Shimoyama et al. by having the first reference pixel area shielded from light and does not have a photoelectric conversion element. The motivation to do so would have been to improve the reliability of the black signals used as a reference to correct the image signal captured by the effective pixel area. .

Regarding claim 2, the combined teaching of AAPA in view of Shimoyama et al. and further in view of Tetsuji as discussed and analyzed in claim 1 teaches that the first reference signal includes a signal free from influence of a signal converted by a photoelectric conversion element of the image sensing element (See Shimoyama et al., signal from blind pixels, Col. 3, line 45 – col. 6, line34; see also col. 1, line 54 – col. 2, line 18), and the second reference signal includes a signal containing a dark current component generated in the photoelectric conversion element of the image sensing element (See AAPA, signals from optical black region 6; Shimoyama et al., signals from dummy pixels DC). Grounds for rejecting claim 1 apply here.

Regarding claim 3, the combined teaching of AAPA in view of Shimoyama et al. and further in view of Tetsuji as discussed and analyzed in claim 1 teaches that the second reference signal includes a signal obtained in a region which includes the photoelectric conversion element in the image sensing element and is shielded from incident light (See AAPA, signals from optical black region 6; Shimoyama et al., signals from dummy pixels DC). Grounds for rejecting claim 1 apply here.

Regarding claim 4, the combined teaching of AAPA in view of Shimoyama et al. and further in view of Tetsuji as discussed and analyzed in claim 1 teaches that the first reference signal includes a signal obtained in a region which does not include the photoelectric conversion element in the image sensing element (See Shimoyama et al., blind pixels BC as shown in fig. 5; col. 3, line 45 – col. 4, line 11). Grounds for rejecting claim 1 apply here.

Regarding claim 9, AAPA discloses an image sensing apparatus (Fig. 7) comprising: a photoelectric conversion region which includes two-dimensionally arrayed photoelectric conversion elements (See fig. 7); and a correction unit (optical black clamping circuit 103) which corrects the signal from the photoelectric conversion region on the basis of a reference signal (signal from the optical black region 6) common to signals from the two-dimensionally arrayed photoelectric conversion elements, wherein the reference signal contains a dark current component generated in the photoelectric conversion element (page 1, line 13 – page 5, line 17).

AAPA does not explicitly disclose a first correction unit which corrects a signal from the photoelectric conversion region on the basis of a first reference signal common to each line, wherein the first reference signal includes a signal free from influence of a signal generated by the photoelectric conversion element.

However, Shimoyama et al. teaches an image sensing apparatus (Fig. 4) using an image sensing element (Fig. 4: 1), comprising: a setting unit which sets, in one image signal output from the image sensing element, a signal (effective image signal from region RP as shown in fig. 5) from a predetermined pixel region, a first reference

signal for DC recovery (from blind pixels BC as shown in fig. 5; col. 3, line 45 – col. 4, line 11), and a second reference signal (from dummy pixels DC as shown in fig. 5; col. 3, line 45 – col. 4, line 11); a first correction unit which correct the signal from the predetermined pixel region for each row on the basis of the first reference signal set by said setting unit (Shimoyama et al. teaches performing dark current correction to the image signal based on the signal values from the blind pixels (Col. 3, line 45 – col. 6, line34)); and a second correction unit which uniformly correct the signals from the predetermined pixel region on the basis of the second reference signal set by said setting unit (Shimoyama et al. teaches performing dark current correction to the image signal based on the signal values from the dummy pixels (Col. 3, line 45 – col. 6, line34; see also col. 1, line 54 – col. 2, line 18)). Shimoyama et al. also discloses that although the invention has been described for a linear sensor, the concepts taught can also be applied to an area sensor (Col. 5, lines 12-16).

Therefore, taking the combined teaching of AAPA in view of Shimoyama et al. as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Shimoyama et al. by having a first correction unit which corrects a signal from the photoelectric conversion region on the basis of a first reference signal common to each line, wherein the first reference signal includes a signal free from influence of a signal generated by the photoelectric conversion element. The motivation to do so would have been to accurately correct dark current signals from the image signal wherein when measurement errors occur in the blind pixels output of a

certain line due to noise, its influences are minimized and streaks can be prevented from occurring as suggested by Shimoyama et al. (Col. 5, lines 17-34).

Regarding claim 10, limitations can be found in claim 3.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) and Shimoyama et al., US Patent 5,355,164 in view of Tetsuji, JP 4-37166 A and further in view of Ookawa, US Patent 6,353,223 B1.

Regarding claim 5, the combined teaching of AAPA in view of Shimoyama et al. and further in view of Tetsuji fails to teach that the first reference signal includes a signal output from a reference power supply for each row of the predetermined pixel region.

However, Ookawa teaches the concept of using a voltage source (Fig. 1; 18) as a reference voltage to correct the image signal form noises generated from temperature changes (Col. 1, line 8 – col. 3, line 18).

Therefore, taking the combined teaching of AAPA and Shimoyama et al. in view of Tetsuji and further in view of Ookawa as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA, Shimoyama et al. and Tetsuji by using a voltage source to supply a reference signal for each row of the predetermined pixel region. The motivation to do so would have been to correct the image data accordingly to noise changes due to temperature as suggested by Ookawa (Col. 1, line 8 – col. 3, line 18).

8. Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) and Shimoyama et al., US Patent 5,355,164 in view of Tetsuji, JP 4-37166 A and further in view of Ide at al., US Patent 6,304,292 B1.

Regarding claim 6, the combined teaching of AAPA in view of Shimoyama et al. and further in view of Tetsuji as discussed and analyzed in claim 1 teaches that the second correction device has a storage device which stores the signal from the effective pixel area (See AAPA, page 2, line 18 – page 3, line 9) but fails to teach a calculation device which calculates a representative value of the second reference signal (optical black signal), and a subtraction device which subtracts the representative value of the second reference signal that is calculated by the calculation device.

However, Ide et al. teaches an imager (See fig. 1: 12 and fig. 10), comprising an optical black detection area (See fig. 10) and an effective pixel area (See fig. 10), wherein the signal values from the optical black detection area are averaged by a clamp level calculation circuit (Fig. 9: 50) and the averaged values of the signals from the optical black detection area are subtracted for the image signal (Col.6, line 53 – col. 7, line 36; col. 9, line 14 – col. 10, line 31).

Therefore, taking the combined teaching of AAPA and Shimoyama et al. in view of Tetsuji and further in view of Ide et al. as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA, Shimoyama et al. and Tetsuji by having a calculation device which calculates a representative value of the second reference signal (optical black signal), and a

subtraction device which subtracts the representative value of the second reference signal that is calculated by the calculation device. The motivation to do so would have been to prevent the black level deviation from occurring as suggested by Ide at al. (Col. 2, lines 52-63).

Regarding claim 8, limitations can be found in claim 6.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) and Shimoyama et al., US Patent 5,355,164 in view of Tetsuji, JP 4-37166 A and further in view of Abe, US Patent 6,700,609 B1.

Regarding claim 7, the combined teaching of AAPA in view of Shimoyama et al. and further in view of Tetsuji fails to teach that the calculation device has a calculation device which calculates representative values of the second reference signal for a plurality of regions obtained by dividing the region which includes the photoelectric conversion element in the image sensing element and is shielded from incident light, and a device which outputs to the subtraction device a lowest value among the representative values of the plurality of regions that are calculated by the calculation device.

However, Abe teaches an imaging apparatus (Fig. 3), comprising an image sensor (Fig. 3: 1), said image sensor comprising an optical black region (Fig. 1: 21), wherein said optical black region is divided into a plurality of regions (every line has a black portion which is compared to other black portion of the adjacent lines, this teaches dividing the black region into a plurality of black portions), and wherein the vale of the

black region corresponding to a line is compared to another black region corresponding to an adjacent line to find an absolute difference between the values (this is read as a representative value), wherein the absolute difference is compared to a predetermined value and if the absolute value is lower that the predetermined value, said absolute value would be used to correct the image signal by sending the average clamp level to a subtracter to subtract it from the image signal and if is larger than the predetermined value the clamp level would be updated (Col. 3, line 60 – col. 5, line 48).

Therefore, taking the combined teaching of AAPA and Shimoyama et al. in view of Tetsuji and further in view of Abe as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA, Shimoyama et al. and Tetsuji by having a calculation device which calculates representative values of the second reference signal for a plurality of regions obtained by dividing the region which includes the photoelectric conversion element in the image sensing element and is shielded from incident light, and a device which outputs to the subtraction device a lowest value among the representative values of the plurality of regions that are calculated by the calculation device. The motivation to do so would have been to improve the image sensing apparatus by correcting the dark current for each row thus flicker is avoided as suggested by Abe (Col. 6, lines 9-24).

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson D. Hernández whose telephone number is (571) 272-7311. The examiner can normally be reached on 9:30 A.M. to 6:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on (571) 272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nelson D. Hernández
Examiner
Art Unit 2622

NDHH
October 27, 2007

LIN YE
SUPERVISORY PATENT EXAMINER